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FORTRAN COMPILER VALIDATION SUMMARY REPORT.(U)
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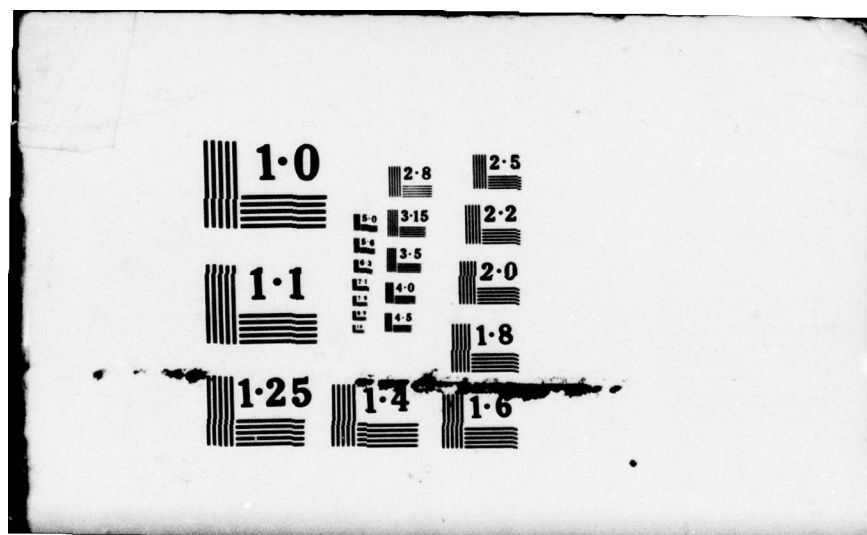UNCLASSIFIED FCCTS/FCVS66-VSR350 NL

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VALIDATION SUMMARY REPORT

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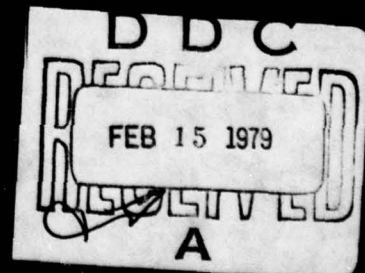Department of the Navy
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FORTRAN COMPILER VALIDATION SUMMARY REPORT.

(14) FCCTS

VALIDATION NUMBER FCVS66-VSR350

(11) 1979

Prepared By:

FEDERAL COBOL COMPILER TESTING SERVICE
DEPARTMENT OF THE NAVY
WASHINGTON, D.C. 20376

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FORTRAN COMPILER VALIDATION

1. Validation Number   FCVS66-VSR350

2. Vendor   Control Data Corporation

3. Mainframe   CDC STAR 100

4. Compiler Identification   FORTRAN IV
                                                        Release 1.3 Cycle I3

5. Operating System Identification   STAR OS, Release 1.3

6. Compiler Validation System Version Number   FCVS66 1.2

*PLEASE NOTE. The Department of the Navy may make full and free public disclosure of the Validation Summary Report (VSR) in accordance with the "Freedom of Information Act" (5 U.S.C. #552). The results of this validadation are only for the purpose of satisfying United States Government requirements, and apply only to the Computer System, Operating System release, and compiler version identified in the VSR. The FORTRAN Compiler Validation System is used to determine, insofar as is practical, the degree to which the subject compiler conforms to American Standard FORTRAN, X3.9-1966. Thus, the VSR is necessarily discretionary and judgmental. The United States Government does not represent or warrant that the statements, or any one of them, set forth in the VSR are accurate or complete. The VSR is not meant to be used for the purpose of publicizing the findings summarized therein.

For information concerning this compiler you can contact the vendor's designated representative named below:

Mr. Will Kane
Control Data Corporation
6003 Executive Boulevard
Rockville, Maryland 20852

79 02 14 009

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SECTION 1. INTRODUCTION

1.1 Purpose of the Validation Summary Report

The purpose of the Validation Summary Report (VSR) is to identify individual FORTRAN language elements whose implementation does not conform to the language specifications defined in American Standard FORTRAN, X3.9-1966.

1.2 Preparation of the VSR

The Validation Summary Report is prepared by analyzing the results of running the FORTRAN Compiler Validation System (FCVS). The FORTRAN Compiler Validation System consists of audit routines containing features of American Standard FORTRAN, their related data, and an Executive Routine which prepares the audit routines for compilation. Each audit routine is a FORTRAN program which includes many tests and supporting procedures indicating the result of the tests.

The testing of a compiler in a particular hardware/operating system environment is accomplished by compiling and executing each audit routine. The report produced by each routine tells whether the compiler passed or failed the tests in the routine. If the compiler rejects some language elements by terminating compilation, giving fatal diagnostic messages, or terminating execution abnormally, then the test containing the code the compiler was unable to process is deleted. The audit routine is compiled again and execution is repeated.

The compilation listings and the output reports of the audit routines constitute the raw data from which the members of the Federal COBOL Compiler Testing Service produce a Validation Summary Report.

1.3 Organization of the VSR

The Validation Summary Report is made up of several sections whose contents are described below.

a. Section 2 summarizes the results of the compilation and execution of the programs comprising the FORTRAN Compiler Validation System. Section 2 is divided into a subsection describing the syntax errors encountered while compiling the FORTRAN audit routines, and a subsection describing the semantic errors which occurred during execution of the FORTRAN audit routines.

b. Section 3 contains information which describes the software environment in which the compiler was tested. This includes the name and version of the operating system and the logical unit/physical device assignments used in the programs comprising the FCVS. The options used with the compiler are also given, and if applicable, the use of compiler optimization features is ex-

plained.

    c.   Appendix A is the Validation Summary Working Document, a working paper resulting from the compilation and execution of the FCVS. The VSR is derived from Appendix A.

1.4. Use of the VSR

The Department of the Navy may make full and free public disclosure of the Validation Summary Report (VSR) in accordance with the "Freedom of Information Act" (5 U.S.C. #552). The results of the validation are only for the purposes of satisfying United States Government requirements, and apply only to the computer system, operating system release, and compiler version identified in the VSR.

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1.5 Sources of Additional Information

The detailed FORTRAN language specifications are given in the publication "American Standard FORTRAN, X3.9-1966", available from the American National Standards Institute, 1430 Broadway, New York, New York 10018.

An explanation of the FORTRAN Compiler Validation System is contained in the FCVS User's Guide. This document explains how to run the compiler validation system. The User's Guide and a magnetic tape containing a copy of the FCVS programs are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22151. (Ordering information can be obtained from the Federal COBOL Compiler Testing Service.)

SECTION 2.   DETAILED EVALUATION OF ERRORS.

This section summarizes the results of the compilation and execution of the programs comprising the FORTRAN Compiler Validation System (FCVS). The version of the FCVS used during this validation is shown inside the front cover of the VSR.

Section 2 is made up of two subsections. The first subsection describes each syntax error encountered during compilation of the audit routines, and the second subsection describes the semantic errors encountered during execution of the audit routines.

Each error or deviation noted in this section makes reference to a program contained in Appendix A (Validation Summary Working Document). This reference provides the documented results of an occurrence of errors/deviations detected during the running of the FCVS using the compiler within the environment identified in this document. The Validation Summary Working Document is presented in sequence by program number.

2.1 Syntactical Errors

    No errors.

2.2 Semantic Errors

    No errors.

SECTION 3. SOFTWARE ENVIRONMENT.

The compiler referenced in this document was validated using the software environment described in this section. When using a modification of the described environment, the compiler may or may not continue to conform to the Standard. It should be noted that during the validation process, an attempt is made to validate as many different options as possible.

The use of compiler options, logical unit/physical device assignments, and any form of optimization which is not described in this report could cause the compiler to produce a program that does not perform according to the specifications of Standard FORTRAN. Only the environment described in this document has been used with this compiler to satisfy the validation requirements of the Department of the Navy.

1. Options or parameters used on the processor call statement for the compiler.

Options specified:

a. Batch - Without Optimization.

FORTRAN(L=LIST,OPT=B)

b. Batch - With Optimization.

FORTRAN(L=LIST,OPT=BO)

c. Batch - With Optimization and Vectorization.

FORTRAN(L=LIST,OPT=BOV)

d. Time-sharing.

The time-sharing processing mode was not used to validate this compiler.

2. Logical Unit/Physical Device Assignments.

a. Batch Compiler Runs.

Printer Destined Files:

Logical unit 06 was assigned to the system printer using the following control card:

PROGRAM FM001(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)

Tape Files:

Logical unit 07 was assigned to a tape file by using the following control cards:

PROGRAM FM100(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,
1TAPE7[9,800,1]=TFILE7)

Sequential Mass-storage Files:

Logical unit 07 was assigned to a mass-storage device by using the following control card:

PROGRAM FM100(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE7=FILE7)

Card Input Files:

Logical unit 05 was assigned to the card reader. The following control card precedes the audit routine when using the card reader.

PROGRAM FM100(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)

b. Time-sharing Compiler Runs.

The time-sharing mode was not used to validate this compiler.

3. Optimization. The compiler may or may not have optimization features.   If there was an optimization feature available, it was used during the validation process (during a separate execution of the Compiler Validation System) to determine if its use causes the compiler to produce a program which does not give the expected results. If the optimization is invoked through the compiler call statement then it is mentioned in paragraph 1 above. If it is invoked through the introduction of a compiler directing source program statement, it is shown below. Optimization which would require modification to source program statments is not considered in this report in that it is beyond the scope of the use of Standard FORTRAN and the validation process.

The optimization feature for this compiler is invoked through the compiler call statement. See 1. above.

4. Compiler.

FORTRAN IV, Release 1.3 Cycle I3

5. Operating system.

     STAR OS, Release 1.3

APPENDIX A

VALIDATION SUMMARY WORKING DOCUMENT

This appendix is a working paper produced during the validation and documents the results of the compilation and execution of each of the programs comprising the FCVS. The results contained herein are based on the use of the compiler within the Validation Environment identified in this appendix. This appendix (Validation Summary Working Document) is not part of the official Validation Summary Report (VSR), and it is not intended to reflect in any way the compiler's usefulness or degree of conformance to the language specifications.

The reader of this appendix should keep in mind that the same problem area may appear in more than one program but is considered only as a single discrepancy, and the problem is reflected only once in the body of the VSR. (The VSR will in turn only reference the first occurrence of the problem in the appendix.)

This appendix is divided into four parts. The first part describes the Validation Environment. The second part lists the Monitor Input Cards used in creating a job control stream for execution in the batch mode. The third part shows the control cards required to compile and execute an individual program. The fourth part of the document is divided into two categories of information: compilation results and execution results. Information items, such as compiler warning messages, are included in the summary of compilation and execution results.

The reference document for FORTRAN is American Standard FORTRAN, X3.9-1966.

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VALIDATION ENVIRONMENT

COMPILER IDENTIFICATION: FORTRAN IV, Release 1.3 Cycle I3

COMPUTER SYSTEM: CDC STAR 100

OPERATING SYSTEM: STAR OS, Release 1.3

    Each of the programs comprising the FCVS was compiled and executed twice in the batch mode. First, the programs were compiled and executed without the compiler optimization feature, and then the programs were compiled and executed with the compiler optimization feature requested. In addition, the programs which test I/O, FM100 through FM108, were run with two different I/O devices. The programs were first run with the output logical unit assigned to a tape device, and then rerun with the unit assigned to a mass-storage device.

FCVS EXECUTIVE ROUTINE CONTROL CARDS

The FCVS Executive Routine was used to prepare the FCVS programs for execution in the batch mode. The Control Cards used as input to the FCVS Executive Routine together with the job control stream for executing the Executive Routine are listed below:

```
JOB,T7777.
USER,10940AA.
REQUEST(TAPE20,F=SI,D=1600,LB=KU)
COPYBR)
*
*
COPY(TAPE20,TAPE22)
REWIND(TAPE22)
COPYEI,TAPE22,TAPE7,V)
REWIND,LGO.
FTN.
REWIND(TAPE22.
LGO.
COPYBR((JIM)
REWIND(TAPE2)
COPYBR(TAPE2,JIM)
PACK(JIM)
REWIND(JIM)
REWIND(LGO)
UPDATE(N=NPL,I=JIM,D,8)
UPDATE(Q,P=NPL,D,8)
PURGE(TAPE8/NA)
PURGE(TAPE9/NA)
DEFINE(TAPE8)
DEFINE(TAPE9)
FTN(T)                              . Compile PPLVP74 processor
LDSET(PRESET=ZERO.
LGO.
REWIND(TAPE8,TAPE9)
SET(R1=0)
COPYBR(INPUT,CS)
COPYBR(INPUT,CS1)
1,REWIND(CS)
REWIND(JOB)
COPYBR(INPUT,JOB)
COPYBR(CS,JOB)
PACK(JOB)
COPYSBF(JOB,PRT)
COPYBR(TAPE8,JOB)
COPYBF,TAPE8,NUL.
```

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```
        IF(R1=14)COPYBF,TAPE9,JOB.
        REWIND(JOB)
        TOSTAR(JOB)
        SET(R1=R1+1)
        IF(R1.EQ.52)GOTO,2.
        IF(R1.EQ.62)GOTO,3.
        DISPLAY(R1)
        GOTO,1.
        2,REWIND,CS.
        REWIND,CS1.
        COPYBR,CS1,CS.
        GOTO,1.
        3,EXIT
                .
                .
                .
Program to copy FORTRAN population tape.
                .
                .
                .
Program to copy PPLVP74 processor.
                .
                .
                .
#DECK,AS001
        PROGRAM AS001(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE7,TAPE8
     1,TAPE9)
#ID XXX
#I AS001.470
        ENDFILE I10
#C AS001
                .
                .
                .
(FORTRAN audit routine selection cards.)
                .
                .
                .
#END-MONITOR
#BEGIN-UPDATE
#START,FM001
        PROGRAM FM001(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
                .
                .
                .
#START,FM100
        PROGRAM FM100(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE7=FILE7)
                .
                .
                .
#END-UPDATE
```

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```
#END-INPUT
NAVY,T2000.
FORTRAN(L=LIST,OPT=BO)
LOAD(CN=LGON,200,OU=MAP)
LGON.
SWITCH(LIST,OUTPUT)
EXIT.
SWITCH(MAP,OUTPUT)
NAVY,T2000.
FORTRAN(L=LIST,OPT=BO)
LOAD(CN=LGON,200,OU=MAP)
LGON.
SWITCH(LIST,OUTPUT)
EXIT.
SWITCH(MAP,OUTPUT)
        .
        .
        .
JOB cards
        .
        .
```

CONTROL CARDS FOR RUNNING FCVS PROGRAMS

The job control stream for an individual program consisted of the following control cards:

```
STORE 010936 TF0260C NAVY12      B
NAVY,T2000.
FORTRAN(L=LIST,OPT=BO)
LOAD(CN=LGON,200,OU=MAP)
LGON.
EXIT.
SWITCH(LIST,OUTPUT)
SWITCH(MAP,OUTPUT)
      .
      .
(FORTRAN audit routine source program)
      .
      .
```

RUN SUMMARIES

FM001 through FM045

    A. Compilation

       No errors.

    B. Execution

       No errors.

FM050 through FM062, FM080 through FM083, and FM097 through FM099

    A. Compilation

       No errors.

    B. Execution

       No errors.

FORTRAN I/O Routines - FM100 through FM108

    These audit routines were executed with the output logical unit assigned to a tape device and rerun with the output logical unit assigned to a mass-storage device.

FM100 through FM108

    A. Compilation

       No errors.

    B. Execution

       No errors.

FM109

    A. Compilation

       No errors.

    B. Execution

       No errors.